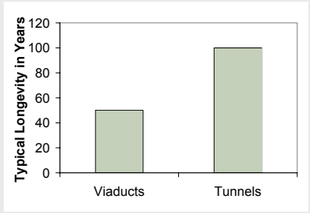
Tunnels are a Good Answer To Complex Urban Problems

- **Tunnels last a long time.** Tunnels constructed over one hundred years ago are still in useful service today; average length of service is consistently greater than viaducts, which need more frequent rebuilding or replacement.



- **Tunnels are strong.** Five tunnels (two on I-90, Battery Street, Third Avenue Bus Tunnel and Burlington Northern) remained structurally sound, with no damage from the 2001 earthquake. Within hours of the 1989 and 1994 California earthquakes, subways in major cities were inspected and back in service.
- **Tunnels are safe.** The U.S. has led the world in advanced tunnel life-safety systems for monitoring, communication, exit pathways, ventilation, fire suppression, and lighting systems for safe transitions from bright sunlight to tunnel lighting. WSDOT operates advanced systems in the I-90 tunnels.
- **More cities are building tunnels**. Examples include: Amsterdam, Boston, Hamburg, Melbourne, Moscow, Oslo, Paris, Shanghai, Stockholm, Sydney and Tokyo.

Job Creation

Over the 14-year project construction period, employment associated with construction would range from 600 jobs during early years of the project (through 2007) to 7,000 jobs during the peak of construction (2009-2011), assuming 31 jobs for every million dollars of construction.

For more information:

- Visit the website at: www.wsdot.wa.gov/projects/viaduct
- Call the Project Hotline (206) 269-4421
- Send an email to viaduct@wsdot.wa.gov

Nationwide Trend: Replacing Roadways that are Concrete Barriers

Cities across the country are rethinking viaducts and rebuilding roadways that serve as barriers to waterfront enjoyment:

Portland, Oregon removed a roadway that blocked access to the Willamette Riverfront. Harbor Drive now runs alongside a 22-block greenway and promenade that features walking and biking trails and public art.

Boston replaced its 50-year old viaduct and replaced with an underground road system. The only part of the older roadway that will remain is the part constructed underground (Atlantic Avenue). The Central Artery project has revitalized the neighborhood. Commercial property values along the new Greenway have increased by 79%, compared to a citywide increase of 41% over the last 15 years.

Sydney, Australia's residents lobbied over a decade for a tunnel to reduce surface traffic (Lane Cove). Tunnels were rebuilt for both the Cross-Sydney tunnel and second Sydney Harbor crossing (previously a bridge).

A Three-Part Economic Analysis of Project Benefits

This is the second of three economic benefit analyses that assess the comparative benefits and costs of each component of the Viaduct and Seawall replacement. The analysis concludes:

- **Transportation Benefits.** The congestion and delay costs of not replacing the Viaduct's transportation capacity are greater than the costs of rebuilding it.
- **Tunnel Benefits.** The tunnel alternative will bring additional local and regional economic benefits that exceed the added investment for the tunnel.
- **Seawall Benefits.** The economic impacts of Seawall failure on the Northwest and national economy far exceed its replacement cost.

Why Replace the Viaduct with a Tunnel:

The Economic Benefits Far Exceed the Tunnel Costs for the Central Waterfront Section

A Dramatically Improved Waterfront Has A Value

Seattle is a beautiful city surrounded by stunning natural features. Connecting the city to an active, revitalized waterfront will improve the city's character and competitive position. People will experience the city as a more vibrant, desirable place, resulting in expanded economic activity, new visitors and enhanced property benefits. Seattle's international standing as a gateway for Washington and the Northwest will be improved, which translates into multiple economic benefits: companies seek to locate their businesses here, the region is more attractive for conventions, and tourists visit and discover Washington.

The benefits of the Tunnel Alternative include a transformed waterfront environment, which will convert into three categories of economic value: enhanced value to waterfront users, new visitor spending across the state, and increased downtown property values. Because the tunnel is a 75+-year improvement, economic benefits need to be measured over time — at least a 25- or 40-year horizon.

The figure below diagrams the relationship among the incremental investment in the tunnel, resulting improvements to the waterfront and the economic benefits that will be realized. As the graphic shows, the tunnel has an incremental cost of $700 million to $1 billion more than the Viaduct Rebuild Alternative.

Economic Benefits Framework: The Tunnel's Benefits will be Realized Locally and Statewide

Washington State Department of Transportation

Federal Highway Administration

City of Seattle

The Tunnel Has Significant Economic Benefits

Enhanced Value of the Waterfront Experience: $700 million to $1 billion over 25 years

"Use value" is the dollar value people place on the value of a particular experience, such as the enjoyment of public spaces or amenities. This value can be reflected in tangible success measures such as investment opportunities for new development, increased urban density and downtown residential growth, business activity including new job creation, and enhanced property values. However, only a portion of the total use value will be captured in these measures.

People who use the waterfront will enjoy a higher value experience if the Viaduct was removed and the transportation capacity was placed in a tunnel. The value will be derived from the combination of removing current obstacles (noise, visual obstruction) and adding new amenities (green spaces, development of under-utilized properties).

Annual visits to Seattle's waterfront are estimated to be 20-30 million per year, including 10-12 million ferry riders passing through the Ferry System's Colman Dock; 8-10 million visitors to the Pike Place Market; and three million fans visiting Safeco Field. Cruise ship patrons, summer concertgoers and visitors to the Aquarium would also enjoy the benefits of a revitalized waterfront.

National survey research on the economic benefit of public parks and amenities shows that people have placed a value per visit of $2-$20 or more on their experiences. Even applying the most conservative assumption of $2 per visit to the estimated 20-30 million annual waterfront visits yields an estimated $40-$60 million in annual use benefits. On a present value basis, **this translates to $700 million to $1.0 billion in economic benefits over 25 years and $1.0 billion to $1.5 billion over 50 years.**

New Visitor Spending: Each 0.5%-1% increase in visits generates $0.5-$1 billion over 25 years

Seattle is a focal point and gateway for the state's tourism industry. The economic benefits of creating a more vital and attractive destination City will be experienced statewide. An improved waterfront will enhance Seattle and the State's competitive position among regional, national and international destinations, drawing more recreational and business travelers. Visitors drawn to Seattle will get exposure to all Washington has to offer: Mt. Rainier, the San Juan Islands, and Washington's wine country.

Currently, the Seattle Convention and Visitors Bureau reports that King County attracts roughly nine million overnight visitors annually, resulting in $3.7 billion in direct spending. The typical overnight visitor stayed five nights and spent about $425 in King County, which in turn generates indirect and induced economic activity throughout the region and state, translating into $633 of total per-visit, new economic activity statewide.

A more attractive city will draw a higher share of potential visitors per year. For every 1% increase in overnight visitors, **that $633 per visitor would turn into nearly $1 billion of new economic activity over 25 years, and $1.5 billion over 50 years.** Given the 9 million visitor base, each 1% increase would represent approximately 90,000 new visitors, or an average of 250 people per day.

To put this into context, San Francisco currently attracts approximately 14 million annual visitors who spend $6 billion per year — a 50% greater number of visitors and almost 100% more visitor spending. It is reasonable to expect a dramatic change to the Seattle waterfront will lead to some narrowing of this tourism gap.

Economic Benefits Accrue to Downtown Seattle Properties

A Central Waterfront Tunnel will Have Tangible Property Benefits

Locally, some of the economic benefits of a tunnel will be realized in the form of increased property values in the central waterfront area and throughout downtown Seattle. The tunnel alternative brings the benefits of opening up the Seattle waterfront and taking buildings out of the shadow and noise of the current structure.

The map at the right shows the potential areas of impact and benefit: adjacent properties, properties in the immediately adjacent neighborhoods, and other downtown properties will all likely experience some benefit. The greatest potential benefit is for the adjacent properties, whose values have been depressed by the negative impacts of the current situation. **The table below estimates the range of estimated property value impacts to be $280 million to $960 million.**

	Assessed Value	Low Estimate	High Estimate
Adjacent Properties	$640 M	$40 M	$120 M
Neighborhood Properties	$2.5 B	$120 M	$240 M
Other Downtown Properties	$12.0 B	$120 M	$600 M
TOTAL	**$17.1 B**	**$280 M**	**$960 M**

Potential Property Value Impacts Associated with the Tunnel

BEFORE: The Viaduct Separates the Waterfront from the City

AFTER: A Promenade will Reconnect the Waterfront with Downtown